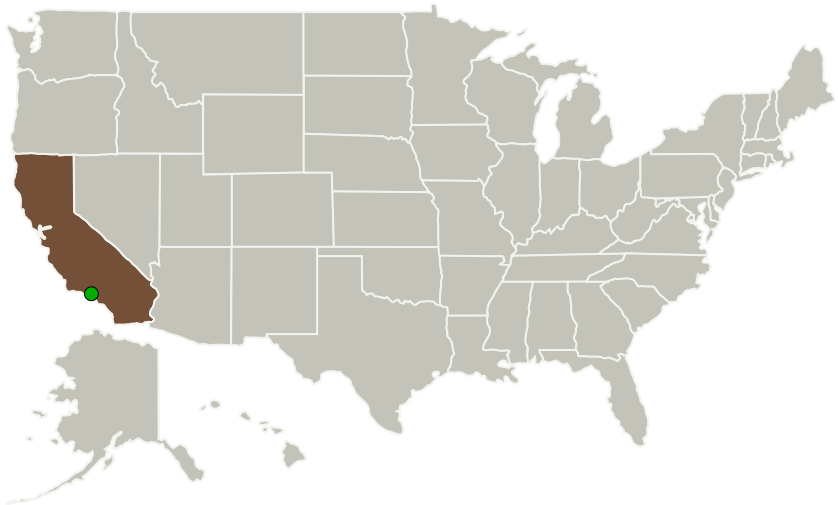
A Compact, Radiation Hardened, Stable, Low Power, Programmable Crystal Oscillator for Extreme Temperature and High Reliability Space Application, Phase II

Completed Technology Project (2011 - 2013)

Project Introduction

Chronos Technology (Div. of FMI, Inc.) proposes to design, fabricate and deliver a conceptually proven, practical, and commercially available solution for a novel compact, radiation hardened, stable, low power, programmable crystal oscillator (RPXO), for high reliability space & extreme temperature applications. Our proposed device will be offered in a robust miniature 5x7mm industry standard surface mount package (0.24 grams only). We have engaged in the Phase I study to further refine the approach with more confidence which concludes that the proposed solution would also offer compelling features such as scalable (wide) frequency range (100KHz to 250MHz), and dual output logic compatibility (CMOS & LVDS). The compelling features of our device features include drastically improved reliability and quicker availability. The overall design of the RPXO includes a radiation hardened SiGe ASIC that operates over the extreme temperature range of -230C to +150C and holds all the necessary functions of a crystal driver circuit, synthesizer, and output buffers. The ASIC uniquely provides dual output logic compatibility (CMOS and LVDS). All aspects of radiation hardness such as TID, ELDERS and SEU have been researched and addressed in the phase 1 study. The SiGe ASIC is integrated with a high reliability and radiation hardened crystal resonator in a highly compliant yet robust miniature package.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations
California

Project Transitions

June 2011: Project Start

May 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138611)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

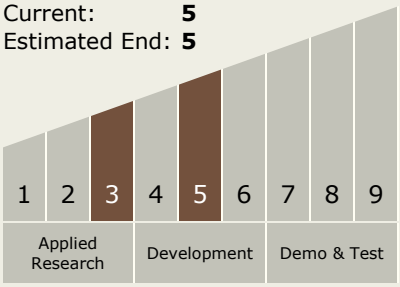
Kouros - Sariri

Co-Investigator:

Kouros Sariri

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.1 Avionics Component Technologies
    - TX02.1.6 Radiation Hardened ASIC Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System